

What is claimed is:

1. A system for detecting a screening-test error, the system comprising:
 - a measurement device that measures at least one performance parameter related to at least one screening-test task; and
 - a computational device, in communication with the measurement device, that receives the at least one measured performance parameter, calculates at least one performance statistical quantity characterizing the measured performance parameter, and compares the at least one performance statistical quantity to at least one reference statistical quantity associated with an error-free screening test.
2. A system according to claim 1, further comprising a display device that displays the extent to which the at least one performance statistical quantity differs from the at least one reference statistical quantity.
3. A system for detecting errors in balance related screening tests, the system comprising:
 - a force-plate for measuring a quantity related to a stability factor of a balance task performed in trials by a subject under a plurality of distinct sensory conditions; and
 - a computation device in communication with the force-plate, the computational device
 - (i) receiving the quantity related to the stability factor for each trial,
 - (ii) determining a rank order for the quantities, each quantity for each trial being associated with a rank, and
 - (iii) determining if any of the ranks associated with a given one of the trials has fallen outside a reference range associated with the given trial performed under error-free conditions.
4. A system according to claim 3, further comprising a display device in communication with the computational device for indicating an instance wherein any of the ranks associated with a given one of the trials has fallen outside a reference range associated with the given trial.
5. A method for detecting a screening-test error, the method comprising:

- measuring at least one performance parameter related to at least one screening-test task; and
- calculating at least one performance statistical quantity characterizing the measured performance parameter; and
- 5 comparing the at least one performance statistical quantity to at least one reference statistical quantity associated with an error-free screening test.
6. A method according to claim 5, wherein the statistical quantity represents a value associated with an average.
7. A method according to claim 5, wherein the statistical quantity represents a value associated with a standard deviation.
- 10 8. A method according to claim 5, wherein the statistical quantity represents a value associated with a standard error.
9. A method according to claim 5, wherein the statistical quantity represents a value associated with a power spectrum.
- 15 10. A method according to claim 5, wherein the statistical quantity represents a value associated with a root mean square.
11. A method according to claim 5, wherein the statistical quantity represents a value associated with a frequency histogram.
12. A method according to claim 5, wherein:
- 20 (i) the screening-test task is a balance task;
- (ii) the at least one performance parameter is sway deviation;
- (iii) the at least one performance statistical quantity corresponds to a moving window root mean square value for velocity of the sway deviation; and
- (iv) comparing the at least one performance statistical quantity to the at least one reference statistical quantity includes determining whether the moving window root mean square value deviates from a constant value by a predetermined threshold value.
- 25 13. A method according to claim 5 wherein:
- (i) the screening-test task is a balance task;
- (ii) the at least one performance parameter is vertical force applied to a force plate;
- 30 (iii) the at least one performance statistical quantity corresponds to a moving window average value for total vertical force applied to the force plate; and

(iv) comparing the at least one performance statistical quantity to the at least one reference statistical quantity includes determining whether the moving window average value deviates from a constant value by a predetermined threshold value.

14. A method according to claim 5, wherein:

- 5 (i) the screening-test task is a balance task;
- (ii) the at least one performance parameter is vertical force applied to a force plate;
- (iii) the at least one performance statistical quantity corresponds to an average of a mathematical derivative of the total vertical force applied to the force plate; and
- (iv) comparing the at least one performance statistical quantity to the at least one
- 10 reference statistical quantity includes determining whether the average deviates from zero by a predetermined threshold value.

15. A method according to claim 5, wherein:

- (i) the screening-test task is a balance task;
- (ii) the at least one performance parameter is horizontal force applied to a force
- 15 plate;
- (iii) the at least one performance statistical quantity corresponds to an average of a mathematical derivative of the total horizontal force applied to the force plate; and
- (iv) comparing the at least one performance statistical quantity to the at least one reference statistical quantity includes determining whether the average deviates from zero
- 20 by a predetermined threshold value.

16. A method according to claim 5, further comprising displaying the extent to which the at least one performance statistical quantity differs from the at least one reference statistical quantity on a display device.

17. A method for detecting errors in balance related screening tests, the method

25 comprising:

- measuring a quantity related to a stability factor of a balance task performed in trials by a subject under a plurality of distinct sensory conditions; obtaining thereby the quantity related to the stability factor for each trial;
- determining a rank order for the quantities, each quantity for each trial
- 30 being associated with a rank; and
- determining if any of the ranks associated with a given one of the trials has

fallen outside a reference range associated with the given trial performed under error-free conditions.

18. A method according to claim 17, further comprising displaying a number corresponding to the number of times a performance of the balance task by the subject has
5 fallen outside the reference range.

19. A method according to claim 17, wherein measuring the quantity related to a stability factor includes following a modified CTSIB protocol.

20. A method according to claim 17, wherein determining a rank order for the performance of the plurality of distinct tasks includes determining a rank order according
10 to the level of difficulty of the balance tasks.

21. A method for detecting a screening test error in an individual trial of a balance task during which sway deviation is measured, the method comprising:

determining a quantity corresponding to a moving window root mean square value for velocity of the sway deviation, the window being short in relation to the duration of
15 the trial but long in relation to the duration of a typical deviation in sway velocity; and
entering an alarm state when the quantity exceeds a threshold value.

22. A method for detecting a screening test error due to malfunctions of at least one vertical force sensing device, the method comprising:

determining a quantity corresponding to a moving window average value for the
20 total vertical force measured by the device, the window being long in relation to the duration of expected spontaneous fluctuations in the total vertical force; and
entering an alarm state when the quantity deviates from a constant valued by a predetermined threshold value.

23. A method for detecting a screening test error due to malfunctions of at least one
25 vertical force sensing device, the method comprising:

calculating an average of a mathematical derivative for the total vertical force measured by the device to determine the rate of change of the total vertical force;

determining a quantity corresponding to an average rate of change of the total vertical force over a predetermined period of time; and

30 entering an alarm state when the average deviates from zero by a predetermined threshold value.

24. A method for detecting a screening test error due to malfunctions of at least one horizontal force sensing device, the method comprising:

calculating an average of a mathematical derivative for the total horizontal force measured by the device to determine the rate of change of the total horizontal force;

5 determining a quantity corresponding to an average rate of change of the total horizontal force over a predetermined period of time; and

entering an alarm state when the average deviates from zero by a predetermined threshold value.

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